

# NASA TECH BRIEF

## *Ames Research Center*



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### Catalyst for Sodium Chlorate Decomposition

Oxygen for use in emergencies or in portable life-support systems is often obtained by the thermal decomposition of chlorates or perchlorates at or above their melting points. Ordinarily, the vigorous decomposition of oxygen-containing materials requires high temperature; it is desirable to lower the decomposition temperature well below the melting point and to increase the rate of generation of oxygen by means of catalysts.

It has been found that when 6.84 percent cobalt oxide ( $\text{Co}_3\text{O}_4$ ) is mixed with sodium chlorate, as much as 60 percent of the chlorate is decomposed in the solid state. Uncatalyzed sodium chlorate begins to decompose at  $391^\circ\text{C}$ ; in the presence of the catalyst, decomposition begins at  $186^\circ\text{C}$ . The catalyst also lowers the decomposition temperature of sodium perchlorate. The rates of decomposition of catalyzed and uncatalyzed sodium chlorate and sodium perchlorate were determined by thermogravimetry, and other parameters of the catalyzed decomposition process were studied by differential scanning calorimetry.

The cobalt oxide catalyst was prepared from cobalt carbonate obtained by precipitation of solutions of reagent-grade cobalt nitrate hexahydrate with an-

hydrous sodium carbonate; the precipitated carbonate was decomposed to  $\text{Co}_3\text{O}_4$  by heating in a muffle furnace for 24 hours at  $338^\circ\text{C}$ . The oxide was then crushed in an agate mortar and stored in a desiccator over anhydrous calcium sulfate. The catalyst had a surface area of  $67 \text{ m}^2/\text{g}$ ; it was ground lightly before mixing with sodium chlorate powder.

#### Reference:

Wydeven, T.: Catalytic Decomposition of Sodium Chlorate. *Journal of Catalysis*, vol. 19, no. 2, p. 162, 1970.

#### Note:

No additional documentation is available. Specific questions, however, may be directed to:

Technology Utilization Officer  
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#### Patent status:

NASA has decided not to apply for a patent.

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